



Review Article

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A REVIEW OF AROGYA PACHA (*TRICHOPUS ZEYLANICUS*)

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ABSTRACT

Arogyapacha (*Trichopus zeylanicus*) also known as "Kerala Ginseng" is a tiny perennial herb that belongs to the Dioscoreaceae family and has a rhizomatous stem. Kani tribes use the unripe fruits as a highly restorative tonic, similar to ginseng. The Kanis assert that eating the plant's fresh fruits will keep one youthful, vigorous, strong and immune to many illnesses. Currently, there is no information available on the Ayurvedic use or identity of this. The aim of this article is to review comprehensive literature on *Trichopus zeylanicus* (Arogyapacha). The literature review was compiled from available published articles relevant to *Trichopus zeylanicus*. This plant is well known for its historical application as a quick energy booster. Besides its antifatigue property, recent pharmacological studies prove that plants possess many medicinal properties, such as antioxidant, antitumor, antistress, immunomodulatory, antidiabetic, aphrodisiac, antiulcer, antimicrobial, cardioprotective and hepatoprotective activity.

Keywords: *Trichopus zeylanicus*, Medicinal plant, Traditional knowledge, Phytochemicals, Antifatigue, Anti stress

INTRODUCTION

From ancient times onward, herbal medicine has played an important role in maintaining human health. There are so many medicinal plants that people have developed over generations and use only within a particular area. Arogya pacha, scientifically known as *Trichopus zeylanicus*, is a fascinating botanical species indigenous to the tropical rainforests of the Western Ghats in India and parts of Sri Lanka. Renowned in traditional medicine systems, particularly Ayurveda, it holds a distinguished position for its multifaceted therapeutic attributes. The vernacular name "Arogya pacha" translates to "green vitality," symbolizing its reputation as a source of holistic wellness and rejuvenation.

For centuries, indigenous communities across the Western Ghats have revered Arogya pacha as a potent tonic and adaptogen, using its medicinal skills to alleviate various ailments and enhance vitality. Men known as "Kani" assert that people can go days without eating and still be full of energy and capable of performing even extremely strenuous physical labour by consuming a handful of the plant's fruits every day. The "Kani" tribe further asserts that consuming the fruits of "Arogyapacha" on a regular basis, he'll continue to be youthful, nimble and healthy, and that nothing sickening will befall him.¹

Modern scientific investigations have corroborated many of the traditional claims surrounding Arogya pacha's pharmacological activities. Its adaptogenic properties enable the body to better cope with physical and mental stressors, while antioxidant compounds help neutralize free radicals, mitigating oxidative damage and strengthening cellular health. Additionally, immunomodulatory effects support immune function, while anti-inflammatory actions offer relief from inflammatory conditions. As interest in natural remedies grows globally, Arogya pacha garners increasing attention from researchers seeking to explain

its therapeutic mechanisms and clinical applications. Emerging studies explore its potential for addressing conditions such as cognitive decline, metabolic disorders, and immune-related ailments. Furthermore, efforts to cultivate and conserve this invaluable botanical resource underscore the imperatives of sustainable utilization and biodiversity conservation. Combining traditional knowledge with scientific validation offers a comprehensive approach to health care that respect cultural diversity while enhancing the availability of safe and effective treatments.

This article includes a comprehensive review of Arogyapacha, unravelling its botanical, phytochemical, and pharmacological details while delineating its role in promoting health and well-being. Through synthesizing traditional wisdom with contemporary scientific insights, we attempt to illuminate the path towards harnessing the full potential of this remarkable medicinal plant.

Morphological Description

It is a small perennial plant that grow from nodose rhizomes and has several thin, 5 to 25 cm long stems. Every stem has a single terminal leaf. The leaves are dark brownish to grey purple, roughly triangular, ovate with an acute or obtuse apex, and basally cordate with a large sinus. The long petiole resembles a continuation of the stem. Small to medium-sized, bisexual flowers, usually solitary, are fascicled at the base of the leaves and protrude from between the scale leaves that act as protection. A dark brown, sub-equally six-lobed perianth, six subsessile anthers on each stamen, and filaments that broaden into broad connectives are seen. Three-celled, inferior ovary with two ovules stacked in each cell. Three lobe stigmas, Fruits are triangular, indehiscent, and have wings to some extent. The immature fruit's soft kernel has a lovely flavour and a sweet taste.¹

Geographical Distribution

There are currently three recognized subspecies of *Trichopus zeylanicus*: *T. zeylanicus subsp. zeylanicus*, *T. zeylanicus subsp. angustifolius*, and *T. zeylanicus subsp. travancoricus*. The first two are native to Sri Lanka, while *T. zeylanicus subsp. travancoricus* is distributed throughout the western ghats of Madagascar and Thailand. There are no known medical benefits for *Trichopus zeylanicus travancoricus*. *Trichopus zeylanicus subsp. travancoricus* is unique to the Agastya Hills in southern India, which is the southernmost point of the Western Ghats Mountain range.²

Phytochemical Constituents

Following phytochemical screening, a variety of phytochemicals, such as flavonoids, tannins, terpenoids, steroids, and saponins, were found in the *Trichopus zeylanicus* extract (aqueous, ethanol, and methanol). The bioactive phytochemical components found in the plant of *Trichopus zeylanicus ssp. travancoricus* Burkhill ex were examined using GC-MS. Solvent ethanol was used for five hours to extract dried and coarsely powdered plant components using the Soxhlet extraction method. There were 22 chemical components found in all. Of the twenty-two compounds found in the ethanolic extract, the following were found to be therapeutically active: 2-methyl-3-oxy-gamma-pyrone (1.87%), 2-methyl-3-hydroxypyrene (2.77%), Pyranone (4.88%), Coumaran (12.74%), Vanillin (1.24%), Isovanillic acid (1.96%), Chinasaure (Quinic acid) (9.15%), alpha-santonin (4.98%), digiprolactone (1.46%), ascorbic acid 2, 6-dihexadecanoate (0.43%), and phenolic derivatives.³

Toxic study

Traditionally, the Kani tribes using the fruits of *Trichopus zeylanicus*, which are edible in nature, Also Kani people drink boiled water from this plant. Communication with Kani tribes reveals information about nontoxic effect of *Trichopus zeylanicus*. Acute toxicity assessment using *Trichopus zeylanicus* saponin fraction was carried out in accordance with OECD recommendations 423 (limit test). Three animals per phase, a total of six female Wistar albino rats, were chosen at random. The animals were given only water during their overnight fast. The oral administration of the test medication was done at a single dose level of 2000 mg/kg b.w. Rats were then watched constantly for the first four hours and then sporadically for the next twenty-four hours to check for toxic signs and death. Since there was no mortality or toxicity observed with the Saponin Fraction of *Trichopus zeylanicus* up to a dose of 2000 mg/kg³

High Quality Draft Genome of *Trichopus Zeylanicus*

The work presents the first draft genome from the genus *Trichopus*, a high quality 713.4 mb genome assembly of *Trichopus zeylanicus*. In the genome of *Trichopus zeylanicus*, 34452 protein-coding genes were predicted by this study. It was discovered that a sizable fraction of these predicted genes was connected to several secondary metabolite biosynthesis pathways. The current genome and annotation data offer a vital resource to expedite studies on *Trichopus zeylanicus* molecular evolution, breeding, and secondary metabolism.⁴

Pharmacological Actions

Antifatigue property

Male adult mice were given an oral dose of alcohol extract derived from *Trichopus zeylanicus* leaves. An hour following the administration of the extract, the plasma glucose level was measured or a swimming performance test was conducted. The tests were conducted both at rest (one hour after the medicine was administered) and after swimming for 45 and 90 minutes, respectively. Mice's plasma glucose levels dropped one hour after

the alcohol-based *Trichopus zeylanicus* leaf extract (100 mg/kg) was administered, and the mice's swimming ability increased to a maximum at that dosage.⁵

A further investigation was carried out to examine the impact of whole plant powder of *Trichopus zeylanicus* on fatigue in juvenile Sprague Dawley rats and elderly, normal, and long-living mutant Ames dwarf mice. An enforced swim test was used to gauge the animals' level of fatigue.⁶

Antioxidant property

The purpose of the study was to determine *Trichopus zeylanicus*'s antioxidant capabilities against free radicals (DPPH and ABTS), as well as its capacity to lower iron, lipoxigenase activity, and lipid peroxidation brought on by hydrogen peroxide with an aqueous suspension of whole plant powder. *Trichopus zeylanicus* suppressed lipoxigenase activity, decreased lipid peroxidation, and dramatically scavenged free radicals. Additionally, *Trichopus zeylanicus* demonstrated the ability to chelate iron and prevent DNA damage caused by reactive oxygen species.⁷

Aphrodisiac property

Aphrodisiacs are drugs that, when taken, increase desire for sex. An ethanol extract of *Trichopus zeylanicus* leaf (200 mg/kg) increased male mice's mounting behaviour and mating performance compared to control mice, per a study on the aphrodisiac qualities of *Trichopus zeylanicus* extract in male mice. It was found that the mice whose pups were administered the extract had normal growth, litter sizes, and sex ratios. The plant leaf extracts in n-hexane and water were found to be harmless. To properly understand this feature or identify the exact chemical generating this influence, more research is necessary. Moreover, it is yet unclear how the drug may affect women's fertility and sexual behaviour⁸

Hepatoprotective activity

The capacity to stop liver damage is known as hepatoprotection or anti hepatotoxicity. Rats have been used to test the choleric and antihepatotoxic effects of *Trichopus zeylanicus* extract. The investigation focused on the liver damage caused by paracetamol in rats. The plant leaf suspension (1000 mg/kg; wet weight) and its methanol extract (100 mg/kg) demonstrated a noteworthy hepato-protective effect based on liver histology, serum marker enzyme levels, and lipid peroxide levels in the liver. It was discovered that the methanol extract's effect depended on concentration. The extracts of water and hexane were essentially inert. In anesthetized normal rats, the methanol extract (100 mg/kg) also demonstrated choleric activity.⁹ An additional investigation was carried out to assess the protective potential of *Trichopus zeylanicus* aqueous leaf extract against ibuprofen-induced liver toxicity and enteropathy in rats¹⁰

Antistress activity

Rats and mice treated with *Trichopus zeylanicus* seed showed strong adaptogenic or antistress characteristics against a range of stressors. investigation using the plant's alcoholic extract. Both normal and adrenalized animals performed better when swimming after consuming the extract. Significantly, it prevented mice from milk-induced leucocytosis and prevented a range of stress-and chemical-induced ulcerations in rats. In mice, no mortality was observed at doses up to 3 g/kg orally. According to the study, animals that eat *Trichopus zeylanicus* seeds experience non-specifically enhanced resistance to a range of stress-induced biochemical changes.¹¹

In another study, the glycopeptide lipid fraction from the alcoholic extract of *Trichopus zeylanicus* Gaertn. was evaluated for putative antistress activity in a battery of tests. Glycopeptide lipid fraction

exhibited significant antistress activity in a dose dependent manner in all the parameters studied, against the different models used to induce non-specific stress viz physically and chemically.¹²

Immunomodulatory activity

Utilizing a range of in vivo models, such as the neutrophil adhesion test, delayed type hypersensitivity reaction, and effect on haematological parameters like total white blood cell count, red blood cell count, haemoglobin, and cyclophosphamide-induced immunosuppression, the immunomodulatory activity of *Trichopus zeylanicus* Gaertn's alkaloid fraction was evaluated. The results of this study show that the alkaloid component of *Trichopus zeylanicus* stimulates the immune system by altering several immunological parameters.¹³

Antitumour activity

Two groups of mice were used in an animal investigation. After seven days of daily oral *Trichopus zeylanicus* water suspension (0.5 ml/mouse), the mice in one group were challenged with 0.5 million Ehrlich ascitic carcinoma (EAC) cells per mouse in the peritoneal cavity. A further twenty days of medication treatment were given. Only the tumour cells were given to the control group (tumour control). Animals were slaughtered twenty days following the tumour challenge, and the peritoneal cavity was thoroughly inspected for the presence of tumour cells.

When mice were treated with *Trichopus zeylanicus* both before and after being challenged with EAC ascetic tumour cells (0.5 million / mouse), 60% of the mice were completely protected from the growth of tumour cells, and the remaining drug-treated mice had significantly fewer tumour cells than the untreated tumour-challenged mice. All of the animals in the tumour control mice (untreated mice) showed complete tumour growth.¹⁴

Antiulcer activity

In both chemically and physically generated models, it is positively discovered that the saponin fraction of *Trichopus zeylanicus* (SFTZ) is more active in alleviating ulceration. In the model of ethanol-induced ulcers, SFTZ demonstrated defense against ethanol-generated free radicals, which cause the stomach mucosa to necrosis. SFTZ demonstrated strong protection against ulcers in the model of ulcers caused by constrained stress, which may be because of a stress-inducing mechanism. By suppressing acid-producing cells, SFTZ may lessen acid secretion in the PL (Pyloric ligation induced) model. These animal models for the anti-ulcer research could all respond differently to different types of stress. The results of this investigation may enable the identification of other active saponin components and their pharmacological actions¹⁵.

Hypolipidemic activity

To assess the positive effects of the *Trichopus zeylanicus* diet on LPO, AO, blood glucose regulation, and lipid profile in albino rats at the alloxan-induced stage. Diabetes mellitus was brought on by an intraperitoneal injection of alloxan two days earlier, and a five-day plant treatment was administered to the third group. The impact of consuming *Trichopus zeylanicus* on lipid profile, LPO, antioxidants, GSH, and glucose was also assessed. The male albino rats' LPO, GSH, and glucose levels were significantly impacted by the plant therapy. A lipid profile improvement was noted, with decreased plasma LDL and LDL and total cholesterol levels as well as higher HDL cholesterol after 5 days of *T. zeylanicus* leaf extract treatment. Thus, the leaf extract of *Trichopus zeylanicus* was found to have hypolipidemic activity.¹⁶

Antimicrobial activity

In vitro antimicrobial activity of *Trichopus zeylanicus* was assessed, and 500 g of cleaned leaves were shade dried for 45

days. These were finely powdered. 30 g of the dried powder were used for the continuous distillation process using Soxhlet apparatus. The solvents used in partial distillation were hexane, chloroform and Methanol. The Filter paper disc diffusion method was used for the in vitro evaluation of antimicrobial activity.

Antibacterial study: The study was conducted on eight strains of bacteria's (*Staphylococcus aureus*, *Bacillus subtilis*, *Salmonella typhi*, *Shigella flexneri*, *E. coli*, *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, *Clostridium tetani*) The most pronounced effect was shown by methanol extract. The hexane extract showed moderate effects against the + ve strains, viz. *Staphylococcus aureus* and *Bacillus subtilis*. Under the -ve strains, *Salmonella typhi* and *Streptococcus pneumoniae* cultures were also moderately inhibited by hexane extract. The chloroform extract did not show notable inhibitory effects against the various cultures

Antifungal study: Under the antifungal studies, the most effective inhibitions were shown by methanol extracts. The hexane extracts showed moderate inhibition against *Alternaria sps.* *Fusarium solani* and *Trichophyton mentagrophytes*. Chloroform extracts proved to have inhibitory effects against *Alternaria sps.* and *Helminthosporium*¹⁷

Cardioprotective effect

The mechanism by which leaves of *Trichopus zeylanicus* reduced isoproterenol-induced myocardial ischemia was studied. Wister strain rats were intoxicated with isoproterenol (20 mg/100 g ip) for two consecutive days after ingesting 500 mg/kg of body weight of *Trichopus zeylanicus* leaves for 28 days. Measurements of creatine phosphor kinase, aspartate amino transferase, alanine aminotransferase, lactate dehydrogenase, serum Troponin T, and levels of reduced glutathione (GSH) and thiobarbituric acid reactive substance (TBARS) in the heart and plasma were used to assess cardioprotection.¹⁸

Anti diabetic activity

An ethanolic extract of *Trichopus zeylanicus* was administered orally for 15 days at a concentration of 400 mg/kg body weight to study potential antidiabetic effects in streptozotocin-induced diabetic rats. The effects were compared with a standard oral dosage of 0.5 mg/kg of Glipalamide. The GOD-POD kit approach was used to assess blood glucose levels. The result shows that the ethanolic extract of *Trichopus zeylanicus* leaves significantly lowered the blood glucose levels of the hyperglycaemic rats. Based on toxicity studies, the ethanolic extract of *Trichopus zeylanicus* was found to be safe up to 5 g/kg of body weight. Additionally, a phytochemical analysis identified the presence of phytosterols, flavonoids, and glycosides. In streptozotocin-induced diabetic rats, the leaf extract was found to dramatically lower the blood glucose level during fasting.¹⁹

Analgesic and Anti-inflammatory

In order to show the analgesic qualities of *Trichopus zeylanicus*, mice were given an alkaloid fraction from methanolic extract, which dramatically decreased the amount of writhing that was brought on by acetic acid in a dose-dependent manner. Another study that used the hot plate approach found a substantial difference between the study group and the control group¹⁸ in the meantime of basal reactions, such as flicking the paw or jumping off the hot plate. The alkaloid portion of *Trichopus zeylanicus* is examined for its anti-inflammatory properties in carrageenan-induced inflammation. It may do this by preventing the release and/or action of substances that resemble prostaglandins, such as histamine, serotonin, kinin, and kinin. The anti-inflammatory properties of *Trichopus zeylanicus* were also demonstrated in rats with granuloma produced by cotton pellets.²⁰



Figure 1



Figure 2

Figure 1, 2: *Trichopus zeylanicus* whole plant



Figure 3: Fruits of *Trichopus zeylanicus*

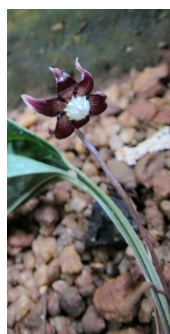


Figure 4: Flowers of *Trichopus zeylanicus*

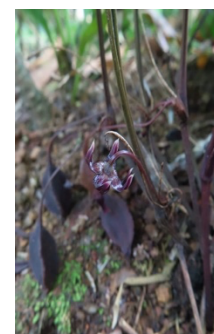


Figure 5: Flowers of *Trichopus zeylanicus*

CONCLUSION

A review of the current literature found that *Trichopus zeylanicus* has a number of medicinal properties, including anti-fatigue, antioxidant, anti-stress, antibacterial, hypolipidemic, hepatoprotective, aphrodisiac, cardioprotective, immunomodulatory, anti-diabetic, anti-ulcer, anti-inflammatory, and analgesic properties. Additional studies have looked at the phytochemical makeup of *Trichopus zeylanicus* and have found bioactive substances like flavonoids, alkaloids, saponins, and triterpenoids. Its potential as an adaptogen has been brought to light by pharmaceutical research, which also reveals that it can improve cognitive performance, reduce stress responses, and increase physical endurance. *Trichopus zeylanicus* has generally been found to have a favourable safety profile in toxicological studies; however, more investigation is necessary to fully evaluate its long-term safety, potential drug interactions, and suitability for various populations, particularly vulnerable ones like children and pregnant women. Future research should concentrate on conducting more thorough clinical trials to confirm the drug's effectiveness in humans and investigating novel formulations to increase the drug's bioavailability and therapeutic advantages. In summary, *Trichopus zeylanicus* exhibits encouraging pharmacological characteristics and a generally safe profile; however, further research is necessary to fully realize its medicinal potential.

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